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RECENT PENNSYLVANIA EXPERIENCES OF AUTHORITY SEWAGE WORKS FINANCING

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RECENT PENNSYLVANIA EXPERIENCES OF AUTHORITY SEWAGE WORKS FINANCING

Samuel I. Zack,¹ M. ASCE

Municipality Authorities Act

The Municipality Authorities Act of 1954 in Pennsylvania has provided a practical means for financing the construction of sewage collection and treatment projects in this State, and practically all the projects recently completed or now being constructed are being done through such financing.

Authorities created under this Act have the powers, without referendum, to sell bonds to pay for the financing and construction of sewage works and to provide revenue through sewer rental charges to amortize and pay interest on the bonds and to pay the annual expenses of operating and maintaining the works so constructed.

Although a law has been passed in Pennsylvania that provides for financing of Public Works by a municipality through the sale of revenue bonds without a referendum and the Attorney General has supported its legality, this law has not been tested in the Courts. Consequently, on advice of Bond Counsel, bonding firms have not been willing to purchase or handle the sale of such revenue bonds.

Sewage Projects Financed by Authorities

Construction of new sewerage systems and sewage treatment plants for the Boroughs of Mechanicsburg, Lemoyne, Middleburg and Shippensburg, and intercepting sewers and treatment plants for Bloomsburg, Gettysburg, Danville and Catawissa completed and placed in operation within the past several years were financed through the sale of municipal authority bonds. The Bloomsburg project also included an incinerator for burning sludge and refuse. Revenue for annual expenses of operation and fixed charges is derived in each case from sewer rental charges. Although it is considered possible to finance construction of lateral sewers through front foot assessments, this method was not used for the municipalities referred to herein. The 1950 population, design population and sewage flows, scope of project involved, amount of construction contracts and the bonds issued in each case are shown in Table 1.

Items of Cost Included in Bond Issues

In addition to the funds required for the construction contracts, the amount of bonds were issued by the Authority in each case to provide for such items as repayment of engineering costs for the preparation of construction plans advanced by the U. S. Government or by the municipality, engineering costs incurred by the Authority before and during construction, real estate and

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rights-of-way, local and bond counsel, printing indenture, trustee's initial fees, administrative and operating expenses or working capital for the Authority, initial debt service reserves, interest during construction and contingencies.

The Authority is usually guided by a financial advisor or fiscal agent and bond counsel in the financing and preparation of prospectuses, financial schedules and indentures. The fiscal agent may be selected to provide for the sale of bonds through public sale or the services of the fiscal agent may be part of the transaction in the negotiated purchase price of the bonds at a private sale. With the exception of Bloomsburg and Danville, the bonds were sold at private sale by negotiation. In the case of Danville where bonds were advertised for public sale, the bond issue also included printing of bonds, and financial advisor's fees, printing and mailing prospectus and advertising in Bond Buyer. The Bloomsburg bonds were first advertised for public sale but as no formal bids were received the bonds were sold by negotiated private sale.

Awarding of Contracts and Sale of Bonds

The receiving of bids for construction and awarding and execution of contracts were timed and coordinated with the private or public sale and delivery of the bonds, so that commitments by the Authority in each case with respect to the contracts and the availability of funds through the sale of bonds both became effective practically simultaneously; so that none of the parties concerned would be left with commitments that could not be fulfilled.

The amount and price of bonds sold, date of issue and maturity, average interest rate and total amount of interest on bonds during scheduled maturity period are shown in Table 2. The discount and premium on the bonds were taken into consideration in calculating the actual average interest rate of the bonds in each case. Although different in each bond issue, various amounts of bonds were designed to mature each year. As the entire bond issue approached maturity and interest charges on unretired bonds became less the principal amount of bonds to be retired became greater each year, or after a period of several years. The average years life of the total principal amount of each bond issue has been calculated by weighting the amount of bonds set up for retirement each year and the life to maturity of such individual bonds.

Trust Indentures Securing Bond Issue

In each case a trust indenture setting forth the requirements for securing the revenue bond issue was executed between the Authority and a Trustee in behalf of the bond purchasers. In all cases the Indenture called for revenues from sewer rental charges to cover the administrative, operating and fixed charges and reserves with provisions for increase in rates in the event of deficiency in the amount of revenue derived.

In all the municipalities discussed in this paper, except Bloomsburg and Gettysburg, the entire projects were leased back to the municipality for operation, maintenance and collection of revenue. The Bloomsburg and Gettysburg projects were managed and operated by the Authority. The lease contract under the Indenture between the Borough and the Authority at Danville guaranteed that the Borough's tax revenues would be provided to make up deficits if sewer rental revenues failed to meet the annual expenses of operation and debt service requirements. At Middleburg an annual contribution towards operating

costs from tax revenue of not less than \$2,500 per year was pledged by the Borough to keep down the amount of individual sewer rental charges and to meet any deficits in annual revenue required for meeting annual expenses. In all cases the financing was set up so that the average of anticipated annual receipts from sewer rentals would be greater than the annual operation and maintenance expenses and average annual debt service and Authority expenses by a substantially safe margin.

It is obvious that collection of revenue as anticipated would thus result in accumulation of surplus funds. Such surplus funds were to be available first to supplement deficits in revenue needed for meeting annual requirements of debt service, Authority expense, operation and maintenance, then to establish reserves for debt service and maintenance, emergency repairs and replacements, and finally for the bond redemption and improvement fund to retire bonds, or to make improvements and additions to the project. Surplus funds from the sale of bonds not used for initial construction purposes also became available for reserves and for bond redemption and improvement funds. Indentures stipulated the redemption price usually of longer maturity bonds when redeemed during the initial years of the bond issue.

In each case provisions were included in the Indenture for the sale of additional and supplemental bonds, if required, with means for providing revenue to service and amortize such supplemental bonds. Supplemental bonds amounting to \$135,000 were sold at Lemoyne and \$250,000 at Mechanicsburg to provide for extension of sewer services, over-run of rock and other unforeseen contingencies.

Sewer Connection and Rental Charges

Each municipality or Authority passed an Ordinance as required setting up a schedule of sewer rental charges, means for collecting such rentals and permitting the placing of liens against owners of property in the event of failure to collect sewer service charges from any property. Next to taxes such liens have priority over any other claims against the properties involved. Trust indentures required that rental rates be increased whenever the revenues were found to be insufficient to meet requirements of operating costs, debt service and reserves.

The Ordinances that were passed required all owners of property to connect their premises with the sewerage system and rentals or charges to become effective at the time of such connection. Rental charges for sewerage service were made subject to penalties if not paid within thirty (30) days after becoming due, with additional penalties if not paid within sixty (60) days after due. It was further provided that all delinquent bills for rentals or charges could be entered as a lien against the property, and such lien to be filed and collected in a manner provided by law for the filing and collecting of municipal claims.

Where the construction of a complete new sewerage system was involved as in Mechanicsburg, Lemoyne, Middleburg and Shippensburg it was not possible to collect any revenues until the treatment plant was completed and connections of sanitary facilities of properties were made to the sewer system and sewer rental charges became due and payable. In order to provide for initial debt service requirements a connection charge for connecting properties to the sewer system was established and collected as soon as connections were made. The amount of such connection charges were made to increase after a given period of time, so that vacant properties connecting at a later date would have to pay a higher amount than those properties connecting initially. The

schedules of sewer connection charges adopted at Mechanicsburg, Lemoyne, Middleburg and Shippensburg are shown in Table 3.

The rate of connecting up of properties to the sewer system is dependent on the number of plumbers in a given area, the willingness of property owners to expedite connecting up and on any difficult excavating conditions encountered due to the prevalence of rock. A great deal of rock was encountered at Mechanicsburg and Lemoyne. The originally contemplated number of 2,300 properties at Mechanicsburg and 1,455 at Lemoyne have now after 3 years been connected to the sewer system, although a period of 4 to 5 years had originally been planned for. At Lemoyne where the immediate need for connection to the sewer system was greater due to existing difficulties with septic tanks because of subsoil conditions and more plumbers were available, 60 per cent of the connections were completed in the first year; whereas at Mechanicsburg only 30 per cent were completed by that time. In one and a half years 82 per cent were completed at Lemoyne and only about 42 per cent at Mechanicsburg. In two years it was 90 per cent against 75 per cent. In both municipalities because of real estate activity, sewer connections are still being made, the total number of connections now being greater than originally contemplated. The rate at which the originally contemplated number of connections were made at Mechanicsburg and Lemoyne are shown in Figure 1.

In anticipation of excessive rock at Shippensburg and a limited number of plumbers it was planned, for estimating revenue from sewer connections and rentals, that it would take at least 4 years to substantially complete the sewer connections. Although the connection charge has to be paid when the connection is made, a delay has to be assumed before fillings can be made for and revenues actually received from sewer rentals. The estimated rate of connecting sewer service billings and receipt of revenue at Shippensburg are shown in Figure 2.

Sewer service charges, except for large users, at Mechanicsburg and Bloomsburg were based on fixtures, since only partial metering of water existed at Mechanicsburg and no metering of small users existed at Bloomsburg. In both cases the water utilities were privately owned. At Middleburg, schedules both on the basis of metered water and on fixtures, were set up since partial metering of water was in effect in the Borough. At Lemoyne and Gettysburg the sewer service rates were based entirely on the metered use of water. Arrangements were made with the private water company to do the billing at Lemoyne. The Municipal operation of the new sewage treatment plant as a means for meeting some of the current expenses such as interest and administration during construction. At Bloomsburg a deduction of 50 per cent was allowed during an initial billing period. It is to be noted that the sewer rental charges at Bloomsburg were set up to also pay annual fixed and operating charges of the sludge and refuse incinerator.

A summary of the sewer rental rates or basis therefor for metered and non-metered water users as adopted by Ordinance for the various municipalities is outlined as follows:

SUMMARY OF SEWER RENTAL RATES

Metered and
Non-Metered Water Users

Strength of Waste
Surcharge Added to Charge
Based on Metered Water or Sewage

Mechanicsburg

Residential and Commerical
Based on Fixtures Table 4.

0.20% for each ppm suspended solids
in excess of 150 ppm plus 0.10% for
each ppm B.O.D. in excess of 200 ppm.

Industrial Wastes Based on Meters
\$25.00 per 1,000 gal./day of avg.
discharge for week of year of max.
discharge or water use.

Lemoyne

Based on Meters -

Residential & Commercial-63¢/100
cu.ft./qtr. for 1st 20,000 cu.ft.; 42¢
for 20,000 to 80,000; 26 1/4 in ex-
cess of 80,000 cu.ft.
Industrial-25¢ per 100 cu.ft. of
wastes/qtr. Min./qtr. Residential
\$4.50 - Commerical \$6.00.

0.10% for each ppm suspended solids
in excess of 150 ppm plus 0.10% for
each ppm B.O.D. in excess of 200 ppm.

Middleburg

Non-Metered Based on Fixtures
Table 5.

0.10% for each ppm suspended solids
in excess of 150 ppm plus 0.10% for
each ppm B.O.D. in excess of 200 ppm.

Metered Based on Min. Qtrly.
Charge \$7.50 w/allowance of 3,000
gal./qtr. First 3,000 gal./qtr. \$2.50
next 5,000 - \$1.50; next 42,000 - 75¢;
next 50,000 - 50¢; all over 100,000 -
30¢. Min. \$7.50/qtr.
Industrial-\$60 per 1,000 gals./day of
avg. discharge for week of year of
max. discharge or water use.

Bloomsburg

Non-Metered Based on Fixtures
Table 6.

0.05% for each ppm suspended solids
in excess of 250 ppm plus 0.05% for
each ppm B.O.D. exceeding 200 ppm.

Metered as follows:

First 200,000 gal./qtr. - 35¢
Next 400,000 gal./qtr. - 25¢
Over 600,000 gal./qtr. - 15¢

**Metered and
Non-Metered Water Users**

**Strength of Waste
Surcharge Added to Charge
Based on Metered Water or Sewage**

Gettysburg

Metered as follows:

First 1,000 cu.ft./qtr. - 30¢/cu.ft.
Next 5,000 cu.ft. 25¢; next 44,000
cu.ft. 15¢; next 300,000 cu.ft. 9¢;
over 400,000 7 1/2¢. Min./qtr.
Domestic 1,000 cu.ft. allowance \$3.00
Commercial & Municipal each 2,200
cu.ft. allowance \$6.00.

0.10% for each ppm suspended solids
in excess of 150 ppm plus 0.10% for
each ppm B.O.D. in excess of 200 ppm.

Danville

Basic Rentals-100% of Water
Charges Min. \$12.00/year

0.10% for each ppm suspended solids
in excess of 250 ppm plus 0.5% for
each ppm of chlorine demand in ex-
cess of 15 ppm.

Metered as follows:

Under 100,000 gals. 20¢ - over
100,000 gal./qtr. 15¢ per 1,000 gals.
Based on credit for metered water
not discharged to sewers or metered
sewage under 100,000 gals./qtr.
20¢/1,000 gals.

Shippensburg

Basic Rentals-350% of Water Charges

0.05% for each ppm suspended solids
in excess of 200 ppm plus 0.05% for
each ppm B.O.D. in excess of 250 ppm.

Metered as follows:

25¢/1,000 gals. of water used/qtr.
Based on credit for metered water
not discharged to sewers or metered
sewage - 35¢/1,000 gals. of water
used/qtr.

Catawissa

Basic Rentals-100% of Water Charges

0.10% for each ppm suspended solids
in excess of 250 ppm plus 0.50% for
each ppm chlorine demand in excess
of 15 ppm.

Metered as follows:

50¢/1,000 gals. of industrial wastes
or water used/qtr. with credit for
water excluded from sewers.

The sewer rental schedules based on fixtures adopted at Mechanicsburg, Middleburg and Bloomsburg are shown in Table 4, 5 and 6 respectively.

The sewer rental schedules based on fixtures or water use provided that the industrial establishments pay a minimum per employee irrespective of the rental payments based on fixtures or water use. These minimum rentals ranged from \$.50 to \$1.50 per employee. Sewer rentals for schools based on

the number of pupils attending ranged from 30¢ to 75¢ per quarter per pupil at Mechanicsburg, Bloomsburg, Shippensburg and Catawissa. In the other municipalities schools were charged on the bases of fixtures or metered water use. The quarterly per capita charges for schools, industries and hospitals are shown in Table 7.

The estimated average annual sewer rentals in those municipalities where a complete new sewerage system had to be built are over \$30.00 per dwelling unit, even though the period to maturity of bond issue is 40 years. In the municipalities which had sewerage systems already built the sewer rentals are less than \$25.00 per dwelling unit per year with bond issues of 30 years or less. At Gettysburg where there was an existing sewerage system, with a high percentage of commercial and industrial and 40 year bonds the annual sewer rental charge amounted to \$17.10 per dwelling unit.

The number of commercial, industrial and other non-residential sewer services, the number of residential dwelling units, the average revenue per service connection, average annual revenue per commercial service, and per residential dwelling unit and the per cent of revenue from residential in the various municipalities are shown in Table 8.

Industrial Waste Regulations

Practically all the sewer rental schedules adopted, defined industrial establishments as any premise used wholly or in part for the manufacture, processing, cleaning, laundering or assembly of any products, commodity or article. The municipality reserved the right to refuse connection to the sewer system or to compel discontinuance of use of a sewer, or to compel pretreatment of industrial waste by an industrial establishment in order to prevent discharges to the sewers considered to be harmful to the sewerage system or sewage treatment plant; or to have a harmful effect on the sewage treatment or sludge handling processes.

Sewer rental rates included a surcharge for strength of waste to be added to the charge based on metered water or sewage as heretofore outlined in the Summary of Sewer Rental Rates. The municipality's representative was permitted to have access at all times to the industrial establishments and to any meters used for establishing or determining water consumption, water excluded from the sewer system, or sewage or waste waters discharged to the sewer system.

The strength of waste to be used for establishing the amount of surcharge could be determined by the municipality either - (a) by suitable sampling and analyses of the wastes at the time of maximum production; (b) by relating production and waste strength at the time of sampling to waste strength at maximum production if sampling is not performed at the time of maximum production; (c) from estimates; or (d) from known relationships of products produced to strength of wastes for those industries where such factors have been established. Any industrial establishment was permitted, under the supervision of a representative of the municipality, to determine or verify the strength of waste for billing purposes by taking samples and making laboratory analyses if the strength of wastes were not so determined by the municipality.

Industries were required to install fine screens to remove husks, hulls, vegetable skins and peelings, thread, lint, grease and other such non-settleable and floating solids or other organic or inorganic substances considered or

found by the municipality to overload, impair the efficiency, or cause difficulties in the operation of the sewage treatment plant or in maintaining quality of treated effluent.

Requirements for equalization of flow by holding tanks were set up in all cases for plants which discharged 50,000 gallons or more of sewage per day to provide uniform discharge over 24-hours, with the provision that peak rates of discharge should not exceed by more than 50 per cent the average 24-hour rate estimated or determined for 3 to 5 days of maximum production. This was to prevent overloading of the treatment plants as designed. In the case of Catawissa, which is one of the smaller plants, equalization of flow and holding tank was required for discharges of 25,000 gallons per day instead of 50,000 gallons per day.

Annual Expense and Revenue

In all the municipalities included in this presentation, the amount of revenue to be received had to be sufficient for the annual payments which had to be made under the Indenture for interest, amortization and reserves, and for operating expenses, which when referred to herein include normal maintenance, repairs and replacements, and administrative costs. Fixed payments had to be such that the revenue received during the initial years would be sufficient for making these payments as they became due. Estimates therefore had to be made of the annual requirements for interest, amortization, reserve funds and Authority expenses under the Indenture, as well as of the annual operating and of the annual revenue which could reasonably be collected. It was not difficult to make these estimates for those municipalities where the collection of sewer rentals were started in advance of the starting of the operation of the treatment plant; that is, in those cases where sewer systems already existed.

As previously mentioned where construction of a new sewer system was involved the receipt of revenue during the initial years of the bond issue was dependent on the progress of construction of the sewer system and treatment plant and particularly on the rate of connecting properties to the new sewer system. Usual practice allowed a property 60 to 90 days to connect after receipt of notice to do so, thus resulting in a time lag beyond and physical ability to make the connection.

The Mechanicsburg and Lemoyne plants have been in operation 4 years, Middleburg 2 years and Shippensburg several months. The revenues collected since operation started have been more than sufficient to meet requirements for fixed and operating charges. Bloomsburg, Gettysburg, Danville and Catawissa plants have been in operation about one year, but collection of revenues were started in each case soon after construction began and revenues have been more than ample.

The dates of bond issue starting construction and operation are shown in Tables 9 and 10.

Annual expenses which have to be covered by the sewer rental charges are costs of operation as previously defined, and expenses of administration including fire, casualty and payroll insurance and taxes, bookkeeping, billing, office rental, telephone, stationery, supplies, postage, engineering and legal services; Authority expenses including Trustee's fees and auditing; and the fixed payments or transfer of funds to the Trustee to meet requirements for interest, retirement of bonds and to provide for establishing debt service, maintenance and other reserve funds.

In those municipalities where complete new sewerage systems and treatment plants were financed and constructed at least two years interest was provided in the bond issue. At Mechanicsburg 2 1/2 years interest was provided. Where a sewer system was already in existence and the project was limited to a treatment plant and intercepting sewers it was possible to start collecting sewer rentals shortly after construction was started. Consequently only one year's interest had to be provided in the bond issues at Bloomsburg and Danville. At Catawissa where collection of sewer rental was started soon after the bonds were sold and less construction time was involved only 1/4 year interest was included. Gettysburg had an existing plant and sewer rentals were in effect before financing and construction of the improvements were started and therefore no funds for interest had to be provided out of the bond issue.

Working capital in greater or lesser amounts was provided out of the bond issue for use by the Authorities until revenues from sewer rentals could be received. A sum of \$50,000 was provided in the bond issue at Gettysburg for construction of relief sewers and miscellaneous repairs and replacements of existing sewers. A debt service fund amounting to \$15,000 at Lemoyne and \$6,000 at Middleburg was provided in the respective bond issues.

Proceeds from the sale of bonds were in all cases deposited with a Trustee and paid out for construction purposes upon requisition by the proper official of the Authority. Balances in this fund after completion of construction were transferred to make up deficits in debt service funds or to various funds, set up to provide reserves, bond redemption or improvements and additions to the project.

Municipalities operating on a lease back were required by the Indenture to deposit with the Trustee either quarterly or semi-annually a fixed amount of funds taken from sewer rental revenue for use by the Trustee to pay interest and principal of bonds, for expenses of the Authority and Trustee, and to establish debt service reserve and maintenance reserve funds. The funds to be deposited with the Trustee were designed to be greater than needed for interest, amortization, reserves and expenses of the Authority and Trustee. Surplus funds could be used for additional redemption of bonds, project improvements and additions, or sewer extensions.

For projects including a sewer system the reserve funds were usually not started until the second, third or fourth year, and were fully established by the fifth or sixth year. Where construction did not involve a new sewer system the reserve funds were started the first or second year and were complete by the third year at Danville, and the fifth year in the other municipalities.

Under the lease back arrangement the municipality paid the operating expenses (including administration) out of sewer rental revenues. After making the required fixed payments to the Trustee and after paying the annual operating expenses, surplus funds had to be deposited with the Trustee for use first to make up deficits in any of the established funds and then for bond redemption, improvements and extensions.

In the case of Bloomsburg all of the sewer rental revenues had to be deposited with the Trustee. Administration and operating expenses were paid out of a working fund which was periodically replenished with funds requisitioned from the Trustee by the officials of the Authority.

Gettysburg deposited the sewer rental revenues into a clearing fund from which the administrative and operating expenses were paid, and the payments to the Trustee were made to cover debt service, reserves and a so-called Capital Additions and Bond Redemption Fund to provide for sewer extensions

and replacement to the extent of 2 per cent of the annual gross revenue from sewer rentals.

The funds for interest, working capital and debt service reserves which were taken out of the various bond issues and the fixed or estimated annual payments for debt service and reserves which had to be made to the Trustee and the annual fixed Authority and Trustee expense are shown in Table 9 and 10.

The Mechanicsburg Indenture provided for a reduction in fixed lease rental payments to the Trustee to 1.10 times the costs of interest and principal on bonds and expenses of Authority and Trustee after redeeming bonds in the amount of \$200,000. After issuing the additional bonds at Mechanicsburg and Lemoyne revenues from sewer rentals had to be sufficient for administration and operating expenses and for 1.10 times the average annual fixed lease rental payments to the Trustee under existing and additional bond issues.

Middleburg was required to collect sufficient sewer rental revenue to provide a margin of safety of 10 per cent over the annual lease rental payments to the Trustee and the annual administrative and operating expenses. This municipality was also required to make an annual contribution of not less than \$2,500 out of its tax revenue in addition to sewer rentals collected.

Sewer rentals had to provide for a 5 per cent margin of safety over the annual fixed lease payments by the municipality at Shippensburg, Danville and Catawissa. The margin of safety had to be increased in the event additional bonds were issued for extensions or improvements.

Sewer rental revenues had to provide a margin of safety of 25 per cent over the average annual debt service requirements at Bloomsburg and Gettysburg.

The average annual fixed charges of each bond issue assuming equal annual payments during the full period of the bond issue to cover interest and amortization without any margin has been determined and tabulated in Table 11, along with the fixed charges including margin of safety and reserves in 1953 and in the 8th year after issue of bonds. In all the municipalities, except Middleburg, the fixed payments under the Indenture reached a maximum by the 8th year. In Middleburg the annual fixed payments continued to increase. The fixed payments in Shippensburg did not start until 1954.

Interest is only paid on bonds which have not been redeemed. The average interest years weighted for the full bond issue has been calculated in each case and also shown in Table 11, together with the amount of bonds issued, years to maturity and the average and actual fixed payments referred to above. The theoretical or average annual debt service factors for various bond maturities and interest rates are shown in Figure 3. The amount of bond issue times the debt service factor equals the average or theoretical annual amount of debt service each year until maturity of the entire bond issue.

Expenditures for one year for administration, billing, operation, maintenance, etc., for each of the municipalities as actually spent, estimated or budgeted are shown in Table 12.

Collection as a percentage of billings for sewer rentals in 1953 ranged from 94 to 101 per cent. Lemoyne had a carryover from the previous year. Some of the collections were deferred at Bloomsburg pending agreement with the State on sewer rental charges to the normal school and until the coming canning season when strength of wastes in one of the canning establishments could be determined. Payment of a bill for industrial wastes from a milk plant was held up in Mechanicsburg in 1953 until the sewer rental charges on account of the volume of wastes not reaching the sewer and the strength of wastes reaching the sewer was established and agreed. Payment of this bill will result in

an increase of billings collected. Sewer rental billings and collections for six of the municipalities are shown in Table 13.

Information was readily available in 5 of the municipalities on the percentage of billings for sewer services to residential users as compared to total billings to residential, commercial and industrial users. As compared to the estimated percentage billings to residential users, shown in Table 8, the actual percentages were very close to estimated in Mechanicsburg and Gettysburg. Percentages of residential billings were greater at Bloomsburg and less at Danville than estimated, which of course indicates that less revenue from commercial and industrial at Bloomsburg and more at Danville are being received than anticipated. Industrial activity has increased at Danville during the past several years. The high percentage of revenue from commercial and industrial at Gettysburg is also of interest. This is explained by the fact that Gettysburg has a larger number of commercial establishments such as stores, hotels, rooming houses, restaurants, etc. than the average municipality to entertain the large number of tourists and visitors and also has a sizeable college.

A comparison of total revenue and annual fixed, operating and total expenses in 1953 for six of the municipalities in Table 14 indicates that in all cases revenue exceeded expenses for that year.

Subsidy from Commonwealth of Pennsylvania

The Commonwealth of Pennsylvania passed a law under which it will pay a subsidy to municipalities annually amounting to 2 per cent of the construction cost of intercepting sewers and treatment plant which have been built since 1937 and will be built in the future under order from the Pennsylvania Sanitary Water Board. A municipality can use the subsidy as income to meet expenses of operation or as additional annual fixed payments toward interest and amortization in which case the retirement of the total bond issue would be advanced. If not used to speed up retirement of bonds sewer rental charges could be reduced.

In reviewing financing aspects of bond issues for new projects, bonding firms and bond counsel have considered the subsidy as income over and above any revenue from sewer rentals. Consequently, projects which otherwise were not considered acceptable for sound financing because sewer rentals to meet annual expenses of operation, fixed charges and reserves were considered to be too high, became acceptable for such financing when the subsidy was taken into account.

The municipalities in this presentation are all entitled to receive the subsidy in 1954 and have made application for it from the Pennsylvania Health Department which is administering the subsidy payments.

The estimated amount of subsidy in each case and the calculated amount of subsidy per dwelling unit and estimated per cent of annual operating expenses in 1953 are shown in the following:

	<u>Total</u>	<u>Per Cent Residential</u>	<u>Per Cent Of Annual Operating Expenses</u>	<u>Per Dwelling Unit</u>
Mechanicsburg	8,000	70.5 ⁽¹⁾	53.5	2.65
Lemoyne	3,700	70.0 ⁽¹⁾	37.5	1.90
Middleburg	3,000	74.0	72.0	5.10
Shippensburg	8,000	78.0	55.0	3.15
Bloomsburg	16,000	70.5 ⁽¹⁾	32.0	3.35
Gettysburg	8,000	45.5 ⁽¹⁾	38.5	2.75
Danville	8,500	58.5 ⁽¹⁾	41.5	2.50
Catawissa	2,500	69.0	41.5	3.20

(1) From 1953 billings - others estimated.

Duties of Consulting Engineer Under Indenture

The Trust Indenture securing the bond issue provides that the sewage project being financed is to be constructed in accordance with plans and specifications prepared or revised by a competent consulting engineer otherwise without variation, and that the Authority is to engage the services of a consulting engineer so long as any of the bonds are outstanding.

The duties of the consulting engineer are quite clearly defined and have prominence in the engineering features affecting the security of the bond issue.

When the bonds are issued the Engineer must certify that, in his opinion, the amounts from the bond issue to be set aside for construction purposes are sufficient to construct the project for which the bonds are issued and that the amounts which may reasonably be collected annually under the Ordinance setting up sewer rental rates will be sufficient - (1) for the annual operating expenses of the project; (2) for payment of the costs of the Authority, the Trustee and for the principal and interest on the bonds; and (3) for establishing the required reserves.

In the event additional bonds have to be issued the Engineer has to certify - (1) that the bonds are being issued and are necessary to pay the cost of completing the project, or for extra-ordinary repairs, renewals or replacements and extensions or improvements; (2) that such construction is required for proper and effective operation of the project and that the funds being provided are estimated to be sufficient therefor; and (3) that the annual revenues of the project as estimated under the existing schedule of sewer rentals or under a supplementary rental schedule will be sufficient to cover costs of operation, fixed charges and reserves.

During construction the Engineer has to approve all payments to contractors for construction of the project and upon completion of the project that the project has been completed in accordance with his plans and specifications. No capital additions are permitted without a certification from the Engineer that such additions are useful or desirable, and that the sewer rentals in effect or to be put into effect are sufficient for operation, fixed charges and reserves.

The Engineer has to certify annually that in his opinion - (1) the schedule of rates and charges in effect is sufficient for annual costs of operation and fixed expenses and for the required reserves; (2) the project is in a proper state of maintenance and repair; (3) repairs, renewals or replacements are needed or not needed for suitable and efficient operation of the project; and

(4) reasonable amounts of fire and casualty insurance are carried by the Authority or municipality. In the event of loss or damage to the project by fire or otherwise, the Engineer has to certify as to the repairs, renewals or replacements that have to be made and as to the payment therefor.

The sale or lease of any property of the project must be certified by the Engineer. In some cases the Engineer is required to make a general inspection of the operating records and policies of the Authority and to make recommendations as to operating methods and as to renewals, replacements, alterations, additions, betterments or extensions or changes in operating policies which may in his opinion be advisable.

Subject to certification by the Engineer reserve funds established for maintenance and repairs and as redemption and improvement funds may be used for renewals, replacements, repairs, additions, extensions or improvements as may be necessary for proper operation, maintenance or repair of the project when the expense of such work is outside the scope of and does not constitute expense of ordinary maintenance and operation.

If reserve funds for maintenance or improvements are to be used for redeeming bonds, a certificate from the Engineer is required to the effect that, in his opinion, money in such funds will not be required for maintenance, repairs or extensions.

The above outlines the principal duties and responsibilities of the consulting engineer under Trust Indentures securing bonds issued by Authorities, although such duties and responsibilities may vary to some extent from one Indenture to another.

Conclusions

The experience of the municipalities outlined herein indicate that sufficient money was obtained through the sale of Authority revenue bonds to construct the sewerage systems, intercepting sewers and pumping stations required; and the interest rates, although higher than current interest rates for general obligation bonds, have not been excessive. This indicates that bond purchasers do not consider investments in Authority bonds for sewage projects as being particularly risky.

Sewer rental rates required to provide for fixed, operating and reserve funds have not been excessive. Except in rare instances the public has not opposed the requirement to connect to the new sewer system and the payment of sewer rental charges. The experience of collections as against billings may be considered to be good. The revenues collected have been sufficient to meet annual expense requirements. In most cases there has been no difficulty in meeting annual payments and setting up required reserves. It appears that sewer rental charges have been more than ample to meet requirements and either could be reduced or the retirement of bonds could be expedited. The cushion provided by the reserves and revenues over requirements would make it possible to reduce rental rates or to overcome deficiencies in collections during a depression.

As a result of the annual subsidy from the State currently in effect the security of Authority bonds have been greatly enhanced.

It is evident that the financing of sewage projects through Authority bonds and annual sewer rental revenues provide practical means for construction and operation of sewage collection and treatment projects where a municipality does not have the ability to finance such projects through the sale of general obligation bonds and to service these bonds from tax revenues.

TABLE 1
CONSTRUCTION CONTRACTS AND AUTHORITY BONDS ISSUED

Authority	Population		Average Sewage Flow Design	Scope of Project	Construction Contracts	Total Bonds Issued
	1950 Census	Design				
Mechanicsburg	6,786	9,800 ⁽¹⁾	.64	Sewerage System & Complete Treatment	\$ 1,082,000	\$ 1,290,000
Lemoyne	4,605	7,000	.53	Sewerage System & Primary Treatment	838,000	1,015,000
Middleburg	1,283	1,700	.16	Sewerage System & Primary Treatment	371,000	475,000
Bloomsburg	10,633	43,000 ⁽¹⁾	2.1	Intercepting Sewers, Inter- mediate Treatment, Refuse & Sludge Incineration	1,030,000	1,250,000
Gettysburg	7,046	8,500	1.0	Primary Treatment Improve- ments, Addition of Secondary Treatment & Relief Sewers	415,000	475,000
Danville	6,994	9,300	1.3	Intercepting Sewer & Primary Treatment	410,000	475,000
Shippensburg	5,722	9,300	.93	Sewerage System & Complete Treatment		1,300,000
Catawissa	2,000	2,000	.20	Intercepting Sewer & Primary Treatment	113,000	150,000

(1) Includes industrial wastes B.O.D. population equivalent of 1,800 at Mechanicsburg and 30,000 at Bloomsburg.

TABLE 2

AUTHORITY BOND FINANCING

Authority	Bonds Issued	Date Of Issue	Interest Rate	Years To Maturity Total Issue	Bond Price	Average Years Total Issue	Actual Avg. Rate of Interest (3) (Calculated)	Total Interest During Life of Bonds
Mechanicsburg	1,040,000 B 6/1/49 250,000 B 6/1/50	3 $\frac{1}{4}$ -3-3/8 3-1/8	40 40	97.50 97.50	26.70 25.22	3.515 3.300	\$ 952,250 (3) 203,281 (3)	
Lemoyne	880,000 B 5/1/49 135,000 B 5/1/50	3 $\frac{1}{4}$ - 3 $\frac{1}{2}$ 3-3/4	40 40	100.00 100.00	25.90 32.41	3.490 3.750	794,775 164,163	
Middleburg	475,000 B 4/1/51 (1)	2-3/4 - 2-7/8	40	100.00	26.02	2.789	344,706	
Bloomsburg	1,250,000 A 4/1/51	2 $\frac{1}{2}$	30	99.00	18.44	2.580	588,750 (3)	
Gettysburg	475,000 A 10/1/51 (2)	2-5/8	40	100.18	24.56	2.606	304,666 (3)	
Danville	475,000 B 2/1/52	1-7/8-2-3	27	100.08	16.50	2.015	158,083 (3)	
Shippensburg	1,300,000 B 4/1/52	2 $\frac{1}{4}$ -2-5/8 2-3/4-2.8	40	99.00	25.99	2.773	927,418 (3)	
Catawissa	150,000 B 5/15/52	2 $\frac{1}{4}$ -2 $\frac{1}{2}$	29	100.00	18.45	2.731	75,712	

A - Operated by Authority.

B - Lease Back to Borough for Operation.

(1) Borough guarantees \$2500 per year from tax revenue.

(2) Borough guarantees to make up deficits from tax revenue.

(3) Allowing for premium or discount on bonds.

TABLE 3
SCHEDULE OF SEWER CONNECTION CHARGES

	<u>Mechanicsburg</u>	<u>Lemoyne</u>	<u>Shippensburg</u>
	<u>Per Connection</u>		
<u>Residential</u>			
First - 6" or less	\$ 30.00	\$ 30.00	\$ 35.00 ^(d)
Additional 6 - 6" each	15.00	15.00	20.00 ^(d)
Over 6 - 6" each			15.00 ^(d)
<u>Commercial</u>			
First - 6" or less	40.00	40.00 ^(b)	50.00
Additional 6" each	20.00	20.00 ^(b)	30.00
First - 8"	50.00	75.00 ^(c)	65.00
Additional 8"	25.00		35.00
<u>Industrial</u>			
6" each	50.00		65.00
8" each	75.00	75.00 ^(c)	90.00
10" each	100.00	(a)	115.00
Over 10"	(a)	(a)	140.00
<u>Future Connections</u>			
	-	Surcharge \$10	
		Per Year Up to \$100	

Middleburg

Each initial connection charge \$75.00 - During 2nd year \$105, 3rd year \$110, 4th year \$115, 5th year \$120, 6th year and thereafter \$125.

- (a) As determined by municipality but not less than \$100.
- (b) Water meter less than 1" - with water meter 1" or 1½" \$50.
- (c) 2" or larger water meter.
- (d) Per family unit.

TABLE 4

MUNICIPAL AUTHORITY OF THE BOROUGH OF MECHANICSBURG
QUARTERLY SEWER RENTAL SCHEDULE BASED ON FIXTURES

	<u>Dwelling Units</u>	<u>Commercial (3) Establishments</u>	<u>Public Buildings Hospital RR Station</u>	<u>Restaurants Clubs, Hotels Theaters Recreation Halls</u>	<u>Garages and Service Stations</u>
First Fixture (Sink, Basin or Toilet)	\$ 4.00	\$ 5.00	\$ 10.00	\$ 10.00	\$ 7.50
Each Additional Fixture					
Basin	1.00	1.50	2.00	3.00	3.00
Bath or Shower	1.00	1.50	1.50	3.00	1.50
Toilet	1.50	2.00	2.00	4.00	3.00
Urinal	1.50	1.50	2.00	4.00	3.00
Sink or Laundry Tub (1)	1.50	2.00	2.00	10.00	-
Sink or Laundry Tub (2)	2.00	2.50	2.50	12.50	-
Wash Machine and Tub	.50	1.00	-	-	-
Water Motor	.50	.50	-	-	-
Drinking Fountain	-	.50	.75	.75	.75
Soda Fountain or Bar Drain	-	3.00	-	5.00	-
Refrigerator Drain	-	.75	.75	1.00	.75
Wash Rack	-	-	-	-	10.00

(1) Single.

(2) Double.

(3) Includes stores, offices, banks and other commercial establishments and churches.

TABLE 5

MIDDLEBURG MUNICIPAL AUTHORITY
QUARTERLY SEWER RENTAL SCHEDULE BASED ON FIXTURES

	<u>Residential</u>	<u>Commercial</u>
First Fixture	\$ 7.50	\$ 10.00
Additional Fixtures:		
Sink	2.00	2.50
Bathtub and Shower	1.50	2.00
Lavatories	1.50	2.00
Toilet or Urinals	2.00	2.50
Laundry Tub	2.00	-
Cellar or Garage Drain	1.00	1.50

TABLE 6

MUNICIPAL AUTHORITY OF THE TOWN OF BLOOMSBURG
SCHEDULE OF QUARTERLY SEWER RENTALS BASED ON FIXTURES

	<u>Residential</u>	<u>Commercial</u> (b)	<u>Restaurants, Clubs, Hotels</u>
1st Outlet(Sink, Toilet or Basin)	\$ 2.50	\$ 4.00	\$ 6.00
Each Additional Toilet	1.00	1.50	1.50
1st Toilet	1.25		
Each Additional Toilet	.50		
1st Basin	1.00	1.25 (a)	2.00
Each Additional Basin	.50	.75	1.50
1st Bathtub, Shower or Combination	1.00	1.00	2.00
Each Additional Bath- tub, Shower, etc.	.50	.75	1.00
1st Washing Machine	.50	1.00	1.00
Each Additional Washing Machine	.25	.75	.75
Floor Drain(Also Refrig- erator & Steam)	.25	.50 (a)	.75
1st Sink		1.25	2.00
Each Additional Sink		.75	1.50
1st Urinal		1.00	2.00
Each Additional Urinal		.50	1.50
1st Drinking Fountain		1.25	1.25
Each Additional Drinking Fountain		.75	
1st Dish Washer		1.00	2.00
Each Additional Dish Washer		.75	
Auto Wash Rack(Private Use)		3.00	
Auto Wash Rack(For Revenue)		6.00	

(a) Garage \$1.00.

(b) Includes stores, offices, banks, public buildings,
RR station, garages and service stations.

TABLE 7
QUARTERLY PER CAPITA SEWER RENTAL CHARGES
SCHOOLS, INDUSTRIES & HOSPITALS

	<u>Industrial Establishments Minimum per Employee</u>	<u>Schools Per Pupil</u>
Mechanicsburg	\$ 1.50	\$ 0.35
Lemoyne	1.00	(2)
Middleburg	-	(2)
Bloomsburg	0.50	0.30
Gettysburg	0.50	(2)
Danville ⁽¹⁾	0.75	(2)
Shippensburg	1.50	0.75
Catawissa	1.00	0.50

- (1) Hospitals \$1.50 per quarter per person occupying premises.
(2) Same as residential.

TABLE 8
ESTIMATED SERVICES AND REVENUE PER SERVICE

	<u>Number of Services</u>		<u>Average Revenue Per Service Connection</u>	<u>Average Annual Revenue from Rentals</u>		
	<u>Commercial</u>	<u>(1) Residential Dwelling Units</u>		<u>Commercial Service</u>	<u>Per Residential Dwelling Unit</u>	<u>Per Cent from Residential</u>
Mechanicsburg	175	2,125	\$ 28.00	\$ 146.00	\$ 30.50	72
Lemoyne	85	1,370	33.00	210.00	31.50	71
Middleburg	58	439	85.00	124.00	50.00	74
Bloomsburg	85	3,368	-	630.00	24.00	60
Gettysburg	317	1,331	-	90.00	17.10	45
Danville	-	2,000 (2)	-	-	20.40 (2)	76
Shippensburg	190	1,986	31.00	114.00	37.50	78
Catawissa	54	538		108.00	23.50	69

(1) Commercial includes industrial, schools, institutions, hospitals,
public buildings.

(2) Non-metered users includes small commercial.

FUNDS UNDER INDENTURE FOR FIXED CHARGES AND RESERVES
SEWERAGE SYSTEM AND TREATMENT PLANT PROJECTS

	Mechanicsburg	Lemoyne	Middleburg	Shippensburg
Date of Bond Issue	June 1949 (2)	May 1949 (4)	April 1951	April 1952
Construction Started	June 1949	May 1949	June 1951	July 1952
First Sewer Connection Made	Aug. 1950	June 1950	Feb. 1952	April 1954
Bond Maturity - Years	40	40	40	40
Funds from Bond Issue				
Interest: Years	2½ yrs. (2)	2 yrs. (4)	2 yrs.	2 yrs.
Amount	\$98,015	\$62,594 (6)	\$26,375	\$70,558
Working Capital for Authority	1,000	15,000	500	7,000
Debt Service Reserve	-		6,000	-
Funds to Trustee from Sewer Rentals				
During 2nd Year of Bond Issue				
3rd	37,300	\$2,500	\$5,200	\$18,500
4th	53,600	20,800	17,800	39,300
5th	61,600	29,608	25,300	58,000
6th	67,500	55,410	24,000	71,500
7th	68,500	57,300	23,500	78,000
8th & subsequent yrs.	68,000	58,576 (5)	23,500	72,300
Reserves from Funds to Trustee				
During 2nd Year of Bond Issue				
3rd	-	-	\$4,500	\$17,500
4th	15,000	1,000	2,500	2,400
5th	10,000 (3)	15,000	5,000	21,000
6th, etc.	10,000	17,000	4,000	33,100
Total	\$65,000	2,000	2,000	-
Authority and Trustee Expense		\$35,000 (6)	\$18,000	\$74,000
		900	500	1,500 (7)

- (1) For Debt Service & Maintenance.
 (2) Supplementary Bond Issue-June 1950-Interest 1½ Yrs.
 (3) \$10,000 each year until total is reached.
 (4) Supplementary Bond Issue-May 1950-Interest ½ Yr.
 (5) Varies somewhat each yr.-39th & 40th Yr. ea. \$71,600.
 (6) First 2 years \$1200 each.
 (7) First year \$1000.

TABLE 9

FUNDS UNDER INDENTURE FOR FIXED CHARGES AND RESERVES
INTERCEPTING SEWERS AND TREATMENT PLANT PROJECTS

	Bloomsburg (1)	Gettysburg (1)	Danville	Catawissa
Date of Bond Issue	April 1951	Oct. 1951	Feb. 1952	May 1952
Construction Started	June 1951	Oct. 1951	Feb. 1952	June 1952
Sewer Rentals Started or Operation Started	Aug. 1953	May 1953	May 1953	July 1953
Bond Issue Years to Maturity	30	40	27	29
Funds from Bond Issue				
Interest: Years	1	-	1	1
Amount	\$31,250	-	\$10,019	\$ 1,014
Working Capital for Authority	20,000	\$60,000 (2)	1,000	1,000
Debt Service Reserve	-	-	-	-
Funds to Trustee from Sewer Rentals				
During 1st Year of Bond Issue	\$43,406	\$24,200 (3)	\$16,000	\$ 7,725
During 2nd & subsequent years	14,656	24,200	32,000	10,300
Reserves from Funds to Trustee				
During 1st Year of Bond Issue	-	\$ 5,000	\$14,000	\$ 600
2nd	\$15,000	5,000	12,000	1,700
3rd	24,000	5,000	12,000	3,900
4th	22,000	5,000	-	3,900
5th	17,000	5,000	-	3,900
Total	\$78,000	\$25,000	\$38,000	\$41,000 (5)
Authority and Trustee Expense	(4)	(4)	\$ 1,500	900 (5)

(1) Payment to Trustee 1 1/2 times annual debt service.

(2) \$50,000 to capital additions and Bond Redemption Fund for Relief Sewers and \$10,000 as working capital.

(3) Includes estimated \$9,200 per year to capital additions and Bond Redemption Fund.

(4) As may be reasonable.
 (5) First year \$675.

TABLE 10

TABLE 11
INTEREST AND AMORTIZATION

	Total Bonds Issued	Years to Maturity	Average Years Interest	Actual Average Interest Rate	Average Annual Fixed (1) Charges	Fixed Charges Under Indenture 1953	Fixed Charges Under Indenture 8th Year
Mechanicsburg	\$1,040,000	40	26.70	3.515	\$61,138	\$60,100	\$68,000
	250,000	40	25.22	3.300			
Lemoyne	\$880,000	40	25.90	3.490	\$49,348	\$53,515	\$55,721
	135,000	40	32.41	3.750			
Middleburg	\$475,000	40	26.02	2.789	\$20,492	\$15,200	\$23,500
Bloomsburg (2)	\$1,250,000	30	18.44	2.580	\$61,292	\$74,656	\$74,656
Gettysburg	\$475,000	40	24.56	2.606	\$19,491	\$24,200	\$24,200
Danville	\$475,000	27	16.50	2.015	\$23,448	\$32,000	\$32,000
Shippensburg	\$1,300,000	40	25.99	2.773	\$55,685	-	\$72,300
Catawissa	\$150,000	29	18.45	2.731	\$7,783	\$10,300	\$10,300

(1) No adjustment for initial interest from bond issue.

(2) Refuse and sludge incinerator included.

TABLE 12
ANNUAL EXPENDITURES FOR
ADMINISTRATION, BILLING, OPERATION & MAINTENANCE

	Mechanics- burg 1952	Lemoine 1952(a)	Middle- burg 1953	Blooms- burg(c) (Estimated)	Gettys- burg 1953(d)	Danville Budget '54	Shippens- burg (Estimated)	Catawissa (Estimated)
Operating								
Salaries & Wages	\$3,772	\$3,961	\$1,987	\$28,000	\$7,040	\$6,500	\$4,900	\$2,000
Electric Power	2,678	1,282 (b)	517	5,000	1,842	2,400	3,600	400
Maintenance & Repairs	990	2,095	253	2,500	1,890	1,200	500	500
Fuel, Light, Water								
Gasoline & Oil	1,248	653	224	2,500	-	600	400	100
Material & Supplies	1,290	343	94	3,000	3,851	2,300	1,350	600
Insurance & Taxes	631	145	166	3,000	802	750	600	500
Misc. Expenses-Auto, Truck, etc.	845	298	-	600	190	2,400	250	200
Administrative & Bill- ing Salaries & Wages	3,136	2,775	900	5,000	3,660	2,475	3,000	1,700
Telephone	150	121		150		200		
Misc. Office Expense	-	417	15	150	1,015	350	-	-
	\$14,940	\$12,090	\$4,156	\$49,900	\$20,290	\$19,175	\$14,600	\$6,000

(a) Year ending April 30, 1953.

(b) Includes water.

(c) Includes incinerating expenses.

(d) Year ending Sept. 30, 1953.

TABLE 13
SEWER RENTAL BILLINGS & COLLECTIONS 1953

	<u>Billed</u>	<u>Collected</u>	<u>Percent of</u> <u>Billings</u> <u>Collected</u>	<u>Residential</u> <u>Percent of</u> <u>Total Billings</u>
Mechanicsburg	\$71,925	\$69,187(1)	96.2	70.5
Lemoyne	66,203	66,822(1)	101.0	70.0
Middleburg	22,635	22,317(2)	98.6	-
Bloomsburg	132,526	124,731	94.0	70.5
Gettysburg	47,638	47,543	99.8	45.5
Danville	67,422	66,908	99.2	58.5

(1) Exclusive of connection charges.

(2) Exclusive of connection charges and contribution by Borough.

TABLE 14
ACTUAL REVENUE & EXPENSES 1953

	<u>Total</u> <u>Revenue</u>	<u>Annual Expenses</u>		
		<u>Fixed</u>	<u>Operating</u>	<u>Total</u>
Mechanicsburg	\$77,317(1)	\$60,100	\$14,940	\$75,040
Lemoyne	67,142(1)	47,015	12,090	65,605
Middleburg	28,187(2)	15,200	4,156	19,356
Bloomsburg	124,731(3)	74,656	49,900	124,556
Gettysburg	47,543	24,200	20,290	44,290
Danville	66,908	32,000	19,175	51,195

(1) Includes sewer connection charges

Mechanicsburg \$8,130
Lemoyne 320

(2) Middleburg -

Sewer connection & misc. \$2,721
From Borough taxes 3,125

(3) Surplus available from previous year

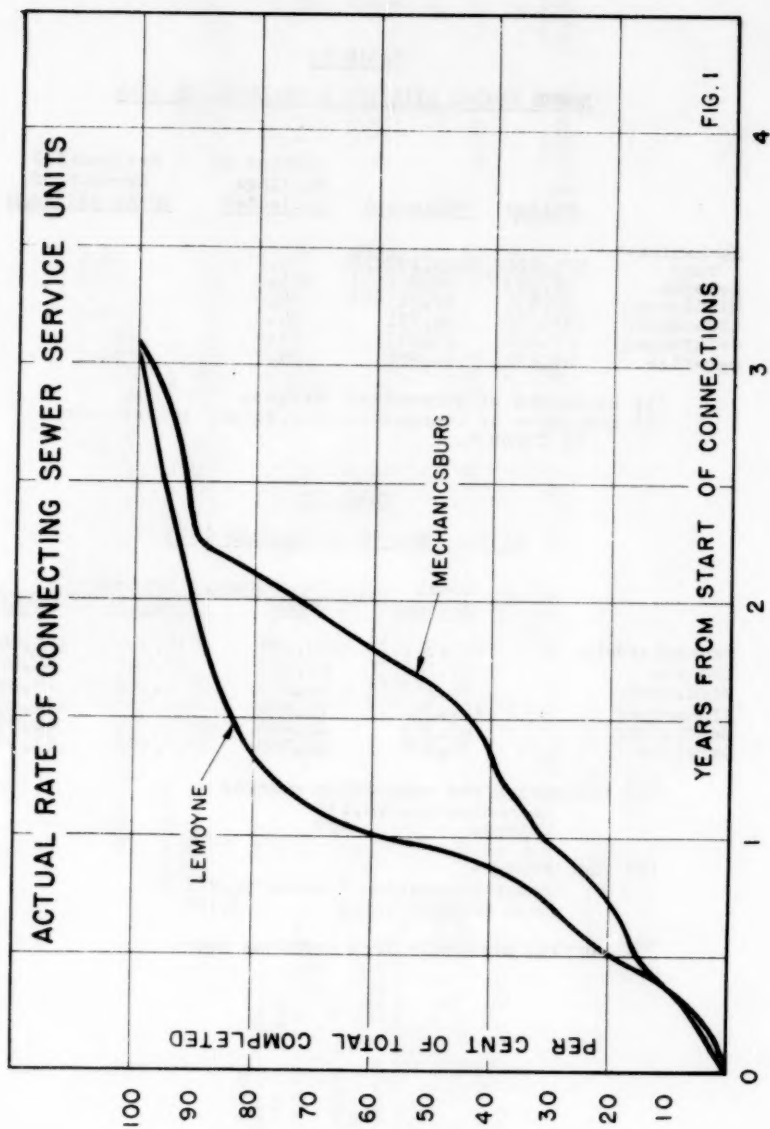
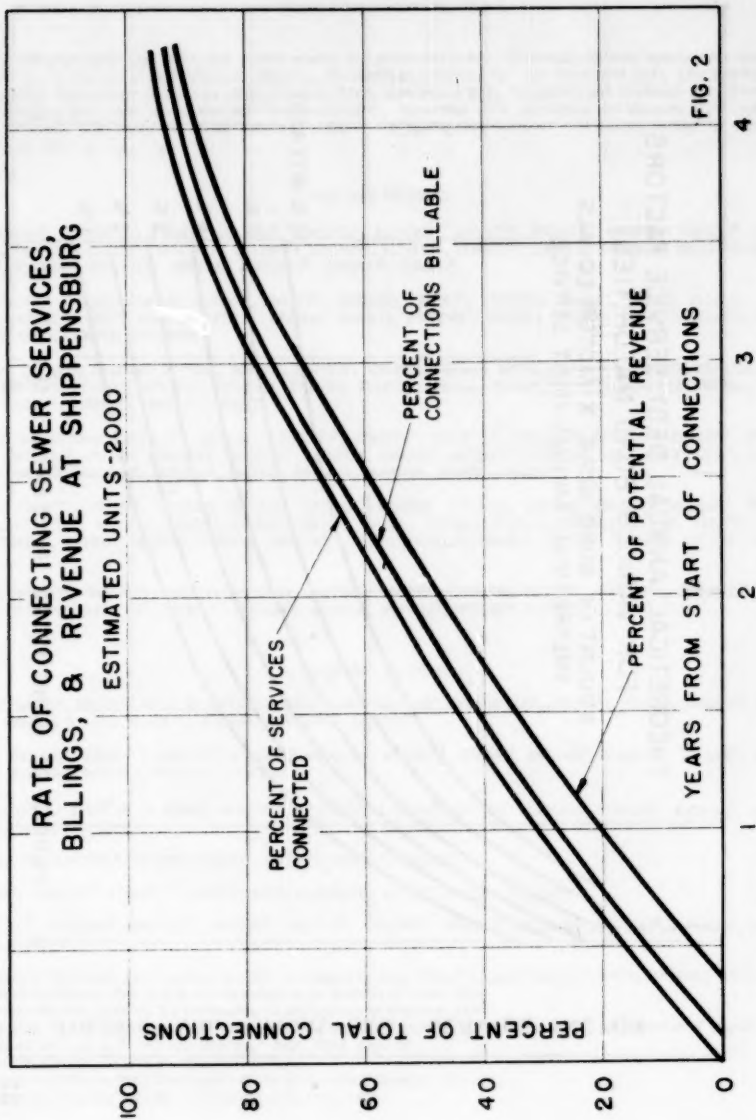
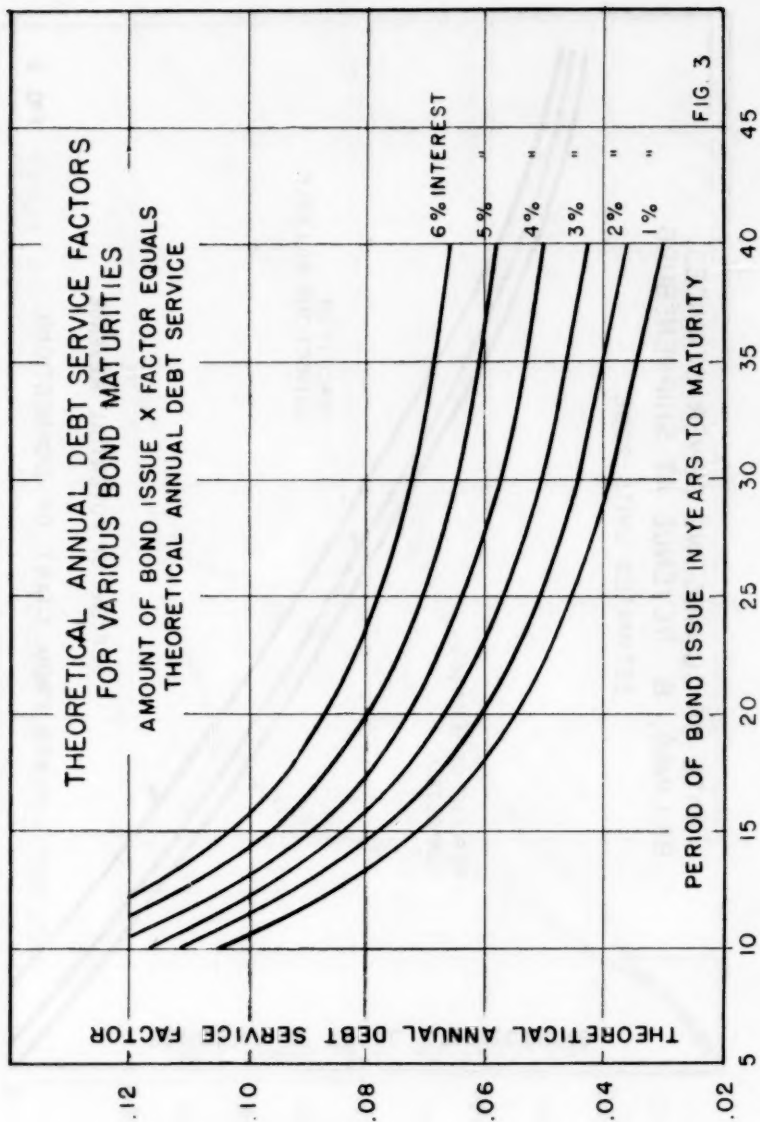


FIG. 1





PROCEEDINGS-SEPARATES

The technical papers published in the past twelve months are presented below. Technical-division sponsorship is indicated by an abbreviation at the end of each Separate Number, the symbols referring to: Air Transport (AT), City Planning (CP), Construction (CO), Engineering Mechanics (EM), Highway (HW), Hydraulics (HY), Irrigation and Drainage (IR), Power (PO), Sanitary Engineering (SA), Soil Mechanics and Foundations (SM), Structural (ST), Surveying and Mapping (SU), and Waterways (WW) divisions. For titles and order coupons, refer to the appropriate issue of "Civil Engineering" or write for a cumulative price list.

VOLUME 79 (1953)

JULY: ^a 200(SM)^b, 201(ST)^b, 202(EM)^b, 203(SM)^b, 204(AT)^b, 205(EM)^b, 206(ST)^b, 207(SA)^b, 208(SA)^b, 209(ST)^b, 210(SU)^b, 211(EM)^b, 212(SU)^b, 213(IR)^b, 214(HW)^b, 215(SM)^b, 216(ST)^b, 217(ST)^b, 218(ST)^b, 219(ST)^b, 220(SM)^b, 221(HW)^b, 222(SM)^b, 223(EM)^b, 224(EM)^b, 225(EM)^b, 226(CO)^b, 227(SM)^b, 228(SM)^b, 229(IR)^b.

AUGUST: 230(HY), 231(SA), 232(SA), 233(AT), 234(HW), 235(HW), 237(AT), 238(WW), 239(SA), 240(IR), 241(AT), 242(IR), 243(ST), 244(ST), 245(ST), 246(ST), 247(SA), 248(SA), 249(ST), 250(EM)^c, 251(ST), 252(SA), 253(AT), 254(HY), 255(AT), 256(ST), 257(SA), 258(EM), 259(WW).

SEPTEMBER: 260(AT), 261(EM), 262(SM), 263(ST), 264(WW), 265(ST), 266(ST), 267(SA), 268(CO), 269(CO), 270(CO), 271(SU), 272(SA), 273(PO), 274(HY), 275(WW), 276(HW), 277(SU), 278(SU), 279(SA), 280(IR), 281(EM), 282(SU), 283(SA), 284(SU), 285(CP), 286(EM), 287(EM), 288(SA), 289(CO).

OCTOBER: ^d 290(all Divs), 291(ST)^c, 292(EM)^c, 293(ST)^c, 294(PO)^c, 295(HY)^c, 296(EM)^c, 297(HY)^c, 298(ST)^c, 299(EM)^c, 300(EM)^c, 301(SA)^c, 302(SA)^c, 303(SA)^c, 304(CO)^c, 305(SU)^c, 306(ST)^c, 307(SA)^c, 308(PO)^c, 309(SA)^c, 310(SA)^c, 311(SM)^c, 312(SA)^c, 313(ST)^c, 314(SA)^c, 315(SM)^c, 316(AT), 317(AT), 318(WW), 319(IR), 320(HW).

NOVEMBER: 321(ST), 322(ST), 323(SM), 324(SM), 325(SM), 326(SM), 327(SM), 328(SM), 329(HW), 330(EM)^c, 331(EM)^c, 332(EM)^c, 333(EM)^e, 334(EM), 335(SA), 336(SA), 337(SA), 338(SA), 339(SA), 340(SA), 341(SA), 342(CO), 343(ST), 344(ST), 345(ST), 346(IR), 347(IR), 348(CO), 349(ST), 350(HW), 351(HW), 352(SA), 353(SU), 354(HY), 355(PO), 356(CO), 357(HW), 358(HY).

DECEMBER: 359(AT), 360(SM), 361(HY), 362(HY), 363(SM), 364(HY), 365(HY), 366(HY), 367(SU)^e, 368(WW)^e, 369(IR), 370(AT)^e, 371(SM)^e, 372(CO)^e, 373(ST)^e, 374(EM)^e, 375(EM), 376(EM), 377(SA)^e, 378(PO)^e.

VOLUME 80 (1954)

JANUARY: 379(SM)^e, 380(HY), 381(HY), 382(HY), 383(HY), 384(HY)^e, 385(SM), 386(SM), 387(EM), 388(SA), 389(SU)^e, 390(HY), 391(IR)^e, 392(SA), 393(SU), 394(AT), 395(SA)^e, 396(EM)^e, 397(ST)^e.

FEBRUARY: 398(IR)^f, 399(SA)^f, 400(CO)^f, 401(SM)^e, 402(AT)^f, 403(AT)^f, 404(IR)^f, 405(PO)^f, 406(AT)^f, 407(SU)^f, 408(SU)^f, 409(WW)^f, 410(AT)^f, 411(SA)^f, 412(PO)^f, 413(HY)^f.

MARCH: 414(WW)^f, 415(SU)^f, 416(SM)^f, 417(SM)^f, 418(AT)^f, 419(SA)^f, 420(SA)^f, 421(AT)^f, 422(SA)^f, 423(CP)^f, 424(AT)^f, 425(SM)^f, 426(IR)^f, 427(WW)^f.

APRIL: 428(HY)^e, 429(EM)^e, 430(ST), 431(HY), 432(HY), 433(HY), 434(ST).

MAY: 435(SM), 436(CP)^e, 437(HY)^e, 438(HY), 439(HY), 440(ST), 441(ST), 442(SA), 443(SA).

JUNE: 444(SM)^g, 445(SM)^g, 446(ST)^g, 447(ST)^g, 448(ST)^g, 449(ST)^g, 450(ST)^g, 451(ST)^g, 452(SA)^g, 453(SA)^g, 454(SA)^g, 455(SA)^g, 456(SM)^g.

- a. Beginning with "Proceedings-Separate No. 200," published in July, 1953, the papers were printed by the photo-offset method.
- b. Presented at the Miami Beach (Fla.) Convention of the Society in June, 1953.
- c. Presented at the New York (N.Y.) Convention of the Society in October, 1953.
- d. Beginning with "Proceedings-Separate No. 290," published in October, 1953, an automatic distribution of papers was inaugurated, as outlined in "Civil Engineering," June, 1953, page 66.
- e. Discussion of several papers, grouped by divisions.
- f. Presented at the Atlanta (Ga.) Convention of the Society in February, 1954.
- g. Presented at the Atlantic City (N.J.) Convention in June, 1954.

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